Efficacy of Hawaii's Plant Quarantine Program[1]

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Planning-programming-budgeting (PPB) became the official budgeting system of the State of Hawaii when the Fifth State Legislature passed the Executive Budget Act in 1970. Section 4(a) provides that planning, programming, budgeting evaluation, appraisal and reporting shall be by programs grouped by objectives. In addition, it states that the effectiveness of programs in attaining objectives shall be assessed and systematic analysis in terms of problems, objectives, alternatives, costs, effectiveness, benefits, risks and uncertainties all constitute the core of program planning.

This new system necessitated many man hours developing "issue papers" and analytical studies which include among various factors, the important measures of effectiveness of the program. This evening, I will not burden you with such a document but will give the Society an abbreviated report on the efficacy of Hawaii's plant quarantine program.

Hawaii has the geographical advantage of being isolated by thousands of miles of ocean which offer maximum protection with minimum cost. However, improved transportation facilities the past 25 years are jeopardizing this land of paradise. High speed jet aircraft have reduced the time to travel the 2400 miles between the mainland United States and Hawaii to 4½ hours. They are bringing in 1½ million passengers and thousands of parcels of horticultural materials annually. Containerized cargo are transported from the packing sheds on the mainland directly to the front doors of island markets daily. Hawaii is subjected to much danger of increased introduction and establishment of many new and economically important insects and pests.

It is imperative that an optimum level of pest prevention within reasonable cost be continued to be provided by this State. Any reduction in surveillance would result in much financial loss, for the cost of introduced pests in terms of damage and control far exceeds whatever savings are realized by a decrease in quarantine services. Without an effective plant quarantine system, there would be an increase in the number of pests established and spread throughout the islands. The consequences would be as follows:

1. Increase in losses to the agricultural industry in production and control costs amounting to millions of dollars annually;

[1]Presidential address presented at the December, 1972 meeting of the Hawaiian Entomological Society.

2. Adversely affect Hawaii's foreign and domestic horticultural export markets;
3. Add to the present complex pesticide problem associated with control of pests and pesticide pollution of our environments;
4. Cause substantial losses to our home gardens, recreational grounds, and natural resources; and
5. Endanger public welfare in general.

The primary objectives of Hawaii's Plant Quarantine Program are:

1. To prevent the introduction and spread of new and economically important pest organisms by man in conveyances and commodities to minimize losses to agricultural crops, the natural resources and to maintain the general welfare of the public.
2. To provide Hawaii's export industry with fumigation and certification services to facilitate export and to meet various quarantine restrictions of domestic and foreign countries.

Many man hours are spent in the first line of defense against the entry of pests. An analysis of the problem indicates that the entry of pests into Hawaii is primarily by agencies of man, particularly aboard high-speed aircraft. Pests may be brought in purposely or accidentally on plant materials, cargo or by hitchhiking in aircraft, ships or containers. These pests can usually successfully establish with little difficulty in Hawaii because of its warm optimum climate. Once established, these pests cause millions of dollars of damage to our crops annually. A review of the Hawaii Cooperative Economic Reports and data from the Department of Agriculture's Entomology Branch indicate that pests cause more than $2,000,000 in losses annually to twenty six of our major crops.

Preventing the introduction, establishment and spread throughout the State of new and economically important pests is accomplished by a closely integrated pest prevention system involving Federal and State agricultural regulatory agencies. By law, the U.S. Department of Agriculture is responsible for the inspection of plant materials from foreign sources. All domestic movement of plants and feral animals and foreign commodities not restricted by Federal quarantines are under the control of State personnel. The State's annual budget for plant quarantine for the fiscal year 1972-1973 is $409,825.00.

This report is primarily a discussion of the activities of the plant quarantine program of the State of Hawaii. No attempt is made to go into the State's important Detection, Control and Eradication program. Time does not permit a discussion on proposals to treat all arriving aircraft and changes to strengthen the law, especially for the prosecution of violators.

There are several measures of effectiveness of the Plant Quarantine Program. Among these are the number of new pests introduced, the number of pests per acre of cultivated land, the number of pests present statewide as a percentage of the total number of potential pests known else-

where and the estimated total economic losses due to plant pests.

One of the most practical measures is the number of pests intercepted. Data for this category are available and are presented in Table 1 and Table 2. The reports are for a period of approximately 25 years from 1947 to 1972 which included activities in the inspection of foreign nursery stock by the State.

A review of the data indicates the interception of 3,611 lots of prohibited plant materials and 256 lots of various animals. A total of close to 5 tons of soil from individual lots and about 10,000 corn on the cobs were intercepted.

A total of 7,500 insect interceptions were made and they included many pest species not established in Hawaii. Only the important insects not known in Hawaii are listed in Table 1. Numerous other species of insects and plant diseases intercepted are not recorded in this report.

In addition to the routine inspection of transportation facilities and plant products, the State inspectors have spent hundreds of manhours eradicating colonies of guinea pigs, confiscating gerbils, hawks, lizards and snakes.

In conclusion, an examination of the data indicates that the Plant Quarantine Program has been successful in protecting Hawaii's agriculture, natural resources and public welfare from the invasion of many serious pests. Based on the $175 million value of commercial plant crops alone, a quarter reduction in production in one year by new prohibited pests would finance the operation of the Plant Quarantine Program for 107 years.

TABLE 1. *Insects intercepted in quarantine*[1]

HOMOPTERA	
COCCOIDEA	
Aonidiella	Canal Zone 1953; Colorado '57
Aspidiotus	Australia '51, '54; Tahiti '56, '58
Asterolecanium	Costa Rica '57; Tahiti '57
Aulascaspis	India '50
Ceroplastes	Japan '57
Chionaspis	Kwajalein '49
Chrysomphalus	Philippines '49; Jamaica '50
Conchaspis	Canal Zone '52
Ferrisia	North Carolina '54
Furcaspis	Kwajalein '49
Lecanium	Ohio '52
Lepidosaphes	Japan '52; Marshall Is. '56
Paraputo	India '52
Parlatoria	Japan '57
Phenacaspis	Colorado '52
Pinnaspis	Thailand '51
Planococcus	Singapore '56
Poliaspoides	Hong Kong '53
Protopulvinaria	Puerto Rico '60
Pseudaonidia	Japan '51, '57
Pseudaulacaspis	Japan '51, '57; Dom. Rep. '55
Pseudischnaspis	Costa Rica '54
Pseudococcus	B.W.I. '51; Guam '53; Japan '54 Philippines '57
Pulvinaria	Puerto Rico '55
Puto	Costa Rica '54; Guatemala '55 Philippines '57
Selenaspidus	Jamaica '51; B.W.I. '56
Targionia	Japan '56
Vinsonia	Canal Zone '48, '50, '55 B.W.I. '51, Guatemala '51 Dominican Republic '53; Singapore '55
APHIDIDAE	
Amphorophora	Calif. '50
Anuraphis	Calif. '50; Ore. '50; Br. Col. '53
Capitophorus	Calif. '52
Geoica	Indiana '48
Macrosiphum	Indiana '50; Calif. '50
HOMOPTERA	
APHIDIDAE	
Rhopalosiphum	Calif. '52
Pineus	Japan '52
CICADELLIDAE	
Nephotettix	Thailand '49
Pachyopsis	Solomon Is. '49
HETEROPTERA	
COREIDAE	
Arhyssus	Calif. '50, '52
LYGAEIDAE	
Neocattarus	Canal Zone '48
Nysius	Calif. '63
MIRIDAE	
Bromeliaemiris	Australia '55
Lygus	Calif. '50, '51
Mertila	Philippines '50
Neela	Costa Rica '54
Tenthecoris	Canal Zone '47, '55, '57; Honduras '56

[1]Complete data on the species intercepted, hosts and dates are available by writing to: Wm. C. Look, Box 2520, Hon.

TABLE 1. *Insects intercepted in quarantine*[1] *(Continued)*

PENTATOMIDAE	
Acrosternum	Calif. '53
Aethus	Canal Zone '57
Erochymena	Calif. '52
Euschistus	Calif. '62, '64; Ore. '62
Galgupha	Honduras '56
Neottiglossa	Calif. '50
Trichopepla	Texas '67
COLEOPTERA	
CHRYSOMELIDAE	
Callispa	Philippines '47
Chelobasis	Canal Zone '51
Cosmogramma	South America '56
Criocerinae	Australia '54 (Undescribed)
Diabrotica	Calif. '52
Nisotra	Australia '53
Pagria	Australia '54
CURCULIONIDAE	
Anthonomus	Maryland '53
CURCULIONIDAE	
Brachyrhinus	Washington '50; Calif. '51
Calendra	Mass. '50
Conotrachelus	Central America '57
Cotinis	Calif. '64
Curculio	Washington, D.C. '51
Hyperodes	Canal Zone '57
Hypera	Calif. '58
Myrmex	Canal Zone '56
Phyllopertha	Japan '51
Rhynchophorineae	India '50 (Undescribed)
Stenotrupis	Fiji '52
SCARABAEIDAE	
Phyllophaga	Va. '53; La. '56
Phyllopertha	Japan '51
Popillia	Calif. '70
TENEBRIONIDAE	
Eleodes	Calif. '68, '70
LEPIDOPTERA	
NOCTUIDAE	
Autographa	Calif. '58
PYRAUSTIDAE	
Dichocrocis	Japan '55
Nymphula	Calif. '59
Ostrinia	Michigan '69; Ill. '70; Penn. '70; Minn. '70
Terastia	Florida '58

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TABLE 2. *Interception of regulated commodities*

Plant Materials		*Animals Reg. 2*	
Section 150-2 HRS		34 lots	40 Alligators
Soil	763 lots	10 lots	134 Ants
	(9,395 lbs.)	11 lots	289 Crickets
Reg. 1.1 Gramineae	156 lots	4 lots	40 Gerbils
Corn on cobs	906 lots	22 lots	47 Hamsters
	(5,519 cobs)	10 lots	17 Snapping turtles
Reg. 1.2 Bromeliads	165 lots	69 lots	3,522 Mexican jumping beans
Reg. 1.3 Coffee	168 lots	4 lots	11 Lion fish
Reg. 1.4 Crucifers	360 lots	4 lots	32 Piranhas
Reg. 1.5 Orchids	427 lots	1 lot	4 Electric eels
	(3,478 plants)	8 lots	22 Star fishes
Reg. 1.6 Banana	18 lots	30 lots	Various prohibited birds
Reg. 1.7 *Passiflora*	98 lots	1 lot	1 Jaguarondi
Reg. 1.8 *Pinus*	326 lots	2 lots	2 Ocelots
Reg. 1.9 Coconuts	45 lots	1 lot	1 Margay
NW 10 Noxious weeds	103 lots	2 lots	2 Skunks
Reg. 3 Organisms	76 lots	2 lots	2 Chipmunks
	3,611 lots	2 lots	5 Squirrels
		1 lot	8 Poisonous catfish
		2 lots	2 Ribbon eels
		7 lots	6 Iguana + 8 eggs
		15 lots	20 Snakes
		9 lots	518 Helix
		1 lot	1 Falcon
		256 lots	4,746 Total